

**Technische Universität München
D-80333 München**

Method and Apparatus for Characterizing Cells, Cell Aggregates and/or Tissue

Claims

1. An apparatus for characterizing cells, cell aggregates and/or tissue with an analysis unit which includes means for detecting morphological parameters of cells, cell aggregates and/or tissue, and which includes means for evaluating the detected morphological parameters for the purpose of the objective morphological characterization of the cells, cell aggregates and/or tissue.
2. The apparatus as claimed in claim 1, characterized in that the analysis unit comprises an image-forming unit and an image analysis unit.
3. The apparatus as claimed in claim 1 or 2, characterized in that the analysis unit is configured such that the degree of confluence, the cell morphology as a measure for the quality of the cell culture, the proliferation behavior, the presence of microorganisms and/or the cell differentiation can be detected and evaluated.
4. The apparatus as claimed in any of the preceding claims, characterized in that the analysis unit includes means for the statistical evaluation of the detected morphological parameters.

5. The apparatus as claimed in any of the preceding claims, characterized in that there is provided a database with reference parameters typical for cells, cell aggregates and/or tissue and that the apparatus includes comparator means for comparing the detected parameters with the reference parameters.
6. The apparatus as claimed in any of the preceding claims, characterized in that the analysis unit includes means by which adjacent pixels of a detected image with similar brightness values are combined to one image object.
7. An apparatus for cultivating cells, cell aggregates and/or tissue including an incubator, characterized in that the apparatus furthermore includes a device for objectively characterizing cells, cell aggregates and/or tissue as claimed in any of claims 1 to 6.
8. The apparatus for cultivating cells as claimed in claim 7, characterized in that the apparatus furthermore includes a manipulator, a transporter for transporting one or more cell culture vessels between the incubator, the manipulator and the analysis unit as well as a control unit for operating the apparatus.
9. The apparatus as claimed in claim 8, characterized in that the control unit is configured such that the apparatus is operated automatically.
10. A method for characterizing cells, cell aggregates and/or tissue, in which morphological parameters of the cells, cell aggregates and/or tissue are detected and the detected morphological parameters are then evaluated for the purpose of the objective morphological characterization of the cells, cell aggregates and/or tissue.
11. The method as claimed in claim 10, characterized in that statistical values characteristic for the cells, cell aggregates and/or tissue are determined from the detected parameters for the purpose of evaluation.
12. The method as claimed in claim 11, characterized in that the statistical values are compared with values from a reference database which contains values characteristic for cells, cell aggregates and/or tissue.

13. The method as claimed in any of the preceding claims, characterized in that the method furthermore includes the cultivation of cells, cell aggregates and/or tissue.
14. The method as claimed in claim 13, characterized in that the cell cultivation is performed in dependence on the evaluated parameters.
15. The method as claimed in any of the preceding claims, characterized in that the detection and evaluation of the morphological parameters as well as the cultivation of cells are effected automatically.